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ABSTRACT

The Response to Educational Needs Project (RENP) is a compensatory education program which focuses on training teachers to promote student reading achievement. These appendices to a project report provide: a cost analysis of the RENP; information on cost methodology and sample and data collection; cost data; adjusted costs from the Instructional Dimensions Study data and the Michigan Cost Effectiveness Study data; and a comparison of the training costs for the various compensatory education programs discussed in RMC Report UR 328. (Author/MC)

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Technical Appendices Supporting
RMC Report UR 328

RENP COSTS SIMILAR TO OTHER FEDERAL COMP-ED PROGRAMS

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November 1977

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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APPENDIX A

COST ANALYSIS OF RENP

APPENDIX A

COST ANALYSIS OF RENP

INTRODUCTION

The Response to Educational Needs Project (RENP) is a unique compensatory education program. Unlike most programs, RENP focuses on training teachers as the most effective vehicle for promoting student achievement. RENP is organized into three components: reading training, mathematics training, and parent/community involvement. Training in reading and mathematics is carried out through school-based laboratories devoted to each subject area. The parent/community involvement component attempts to promote "active parental and community participation in educational programs and issues" through a staff of community organizers.(1)

In September 1976, Richard A. Gibboney Associates, Inc., awarded a contract to RMC Research Corporation to perform cost studies of RENP. These studies represent part of a summative evaluation of RENP being conducted by Gibboney for the National Institute of Education (NIE). This report is a cost analysis of RENP as it is being conducted during the 1976-77 school year; i.e., the RENP program as currently conceived and funded under the so-called "Phase II" NIE budget.

It should be noted that this analysis somewhat idealizes RENP, in that adjustments have been made for distortions appearing in the program as a consequence of NIE's termination of RENP support. For example, as a result of the imminent termination date, certain staff vacancies have arisen that would not otherwise have occurred. RMC has adjusted for these distortions (1) by assuming all RENP-paid staff are hired on a full-time, twelve months-a-year basis: and (2) by assuming that RENP is fully staffed. Our discussions with RENP leaders have indicated that these assumptions are fair.

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1. D.W. Jackson, Seventh Quarterly Report on the Progress and Activities of the RENP (Washington, D.C.: Response to Educational Needs Program, 1976)

ANALYSIS QUESTIONS

1. How much does RENP cost?

At current operating levels, the annual cost of RENP is approximately $1.921 million. Excluding the free classroom space donated by the District of Columbia Public Schools (DCPS), the cost is about $1.790 million. Table A-1 contains a summary of RENP costs.

RENP currently operates 20 laboratories. The data indicate that, if the number of laboratories is increased or decreased by a small number (5 or less), the change in the actual cost of RENP would be about $73,600 per laboratory. RENP's fixed costs approximate $450,000.

RENP serves 108 teachers with the reading laboratories and 129 teachers with the mathematics laboratories. The total cost to RENP for each teachers trained in reading is $8,909. The total cost to RENP for each teacher trained in mathematics is $7,433. It costs $16,342 to train a teacher in both subject areas.

Our analysis of resources not provided by RENP indicates that the average cost per class of the normal educational program in the District of Columbia is approximately $34,396. Table A-2 presents non-RENP costs; they are discussed more thoroughly under question 2.

The total cost per class of the various types of classes is:

- $34,396 for non-RENP classes,
- $43,305 for an RENP class in which the teacher is trained in reading,
- $41,229 for an RENP class in which the teacher is trained in mathematics, and
- $50,738 for an RENP class in which the teacher is trained in both.

Table A-1

RENP COSTS BY ORGANIZATIONAL STRUCTURE AND COMPONENT

Category	Percent of Total	Reading (dollars)	Mathematics (dollars)	Parent/ Community Involvement (dollars)	General Management (dollars)	Total (dollars)
Administration						
DCPS	6	--	--	--	112,419	112,419
RENP	25	71,712	69,638	123,416	209,984	474,750
Laboratories	55	535,240	533,950	--	--	1,069,190
Organizers	7	--	--	133,960	--	133,960
Subtotal	7	606,952	603,588	257,376	322,403	1,790,390
Laboratory Space		65,430	65,430	--	--	130,860
Total	100	672,382	669,018	257,376	322,403	1,921,179

Table A-2

AVERAGE COSTS PER CLASS, EXCLUDING RENP[a,b]
(dollars)

	Experimental Schools	Control Schools	Significant at .10[c]
Personnel			
Classroom Teachers	16,737 (2,414)	16,494 (2,474)	No
Other Instructional Staff	4,379 (979)	5,013 (1,372)	No
Non-Instructional Staff	1,415 (552)	1,186 (263)	No
Administrative	2,461 (548)	2,297 (300)	No
Facilities	6,543 (0)	6,543 (0)	NA
Textbooks	81 (17)	110 (25)	No
Library Books	95 (42)	95 (32)	No
Supplies and Material	421 (171)	470 (88)	No
Meals	1,718 (616)	1,751 (385)	No
Field Trips	415 (238)	465 (207)	No
Total	34,265	34,424	No

a. Using the school as the unit of observation

b. Standard deviation is in parentheses.

c. Based on t test.

2. Does RENP supplement or supplant resources?

RENP is said to supplement a resource if, on the average, the amount of a given resource exceeding the amount normally available in a school is equal to the amount of that resource provided by RENP. For example, if one reading teacher was normally present in a school, but two reading teachers were present in RENP schools and RENP paid for one, then RENP supplemented the number of reading teachers by one. If, on the other hand, RENP paid for one reading teacher and only 1.5 reading teachers were present in RENP schools, then half of the RENP cost for a reading teacher merely replaced, or supplanted, funds normally available in the absence of RENP.

To examine supplementing effects, it is necessary to compare RENP resource levels with control levels for the same resources. This is particularly easy for RENP because the RENP resources are not supplied in the control schools. Hence, RENP resource funds are totally supplementary.

Of course, a supplanting effect is still possible. Even if RENP totally supplements resource A by, say, $100, the amount of resource B in the school could be reduced by $100, changing the resource mix in the school without affecting the overall funding level. If this is true, however, we would expect that the level of resource B in experimental schools would be less than the level of resource B in control schools.

Table A-2 compares the experimental schools with the control schools by resource category. These categories represent most of the important resource categories in the DCPS. The main conclusion to be drawn is that the data do not support the existence of significant supplanting effects in RENP.

It should be noted that the DCPS performs an explicit resource equalization task because of the continuing federal court decree. DCPS provided information on this equalization. Table A-3, which compares the experimental and control schools on a per pupil basis by funding source, was derived from that information. In Table A-3, RENP funding is part of the "Other Federal Funds" category. The data support the contention that per pupil differences between the control and experimental schools are negligible.

Table A-3

CONTROL AND EXPERIMENTAL SCHOOL PER PUPIL EXPENDITURES BY FUNDING SOURCE(1)

9-23-76 Enrollment	Control Elementary Schools	ESEA Title I	11-76 Expenditures per Pupil	Total Expenditures, Regular Budget	ESEA Title I	Other Federal Funds
746	Ketcham	Yes	839.00	1,022	140	89
647	McGogney	Yes	877.00	1,086	183	195
1,584	Moten	Yes	871.00	1,042	101	92
545	Patterson	No	804.00	951	NA	133
427	Randle Highlands	No	809.00	1,038	NA	60
730	Stanton	Yes	846.00	1,030	228	117
939	Turner	Yes	870.00	1,012	118	107
1,007	Washington Highland	Yes	803.00	953	106	88
	Average		839.88	1,017	146	104
	Experimental Elementary Schools					
786	Birney	Yes	822.00	1,079	138	279
671	Congress Heights	Yes	820.00	999	135	265
504	Draper	Yes	880.00	1,128	126	352
940	Friendship/Oxen Run	No	806.00	1,144	NA	147
803	Green	Yes	857.00	1,047	125	256
742	Hendley	Yes	853.00	1,041	142	262
656	Leckie	No	810.00	984	NA	250
761	Malcolm X	Yes	834.00	1,060	152	279
803	Savoy	Yes	824.00	992	74	261
673	Simon	Yes	867.00	1,042	84	269
	Average		837.30	1,052	122	262

1. This data was provided by the District of Columbia Public Schools.

3. How do the costs of RENP distribute among the various organizational levels?

Of the costs directly associated with the RENP grant, it was found that DCPS receives 6.3 percent of the funds directly, all RENP management functions account for 26.4 percent of the grant, and the remainder of the grant (67.3 percent) is spent for resources applied directly in the schools or community.

We should point out that the RENP management charge could be overstated. It is quite possible that much of the administrative resources do in fact support the program components substantively. For example, much of the administrative equipment is oriented toward producing mailings, handouts, and other community-oriented material, which is a clear substantive contribution to the parent/community involvement component. Taking a more constrained view of management--by considering only the general management component as administration--we see that the percentage of funds for RENP administration is only 11.7 percent of the total program cost. This would imply that the percentage of funds supporting laboratories and community work is 82 percent. The DCPS charge remains unaffected.

In summary, DCPS receives 6.2 percent of the grant funds, RENP administration between 11.7 percent and 26.4 percent (depending on definition), and RENP field resources between 67.3 percent and 82 percent.

4. Do RENP resources vary between sites?

One way of viewing the uniformity of a program's implementation is in terms of the resources available to the sites where the program operates.

By focusing on the laboratories, it is immediately obvious that there is very little variation in cost. This lack of variation arises for three reasons:

(1) Indirect laboratory costs--the prorated share of RENP and DCPS administration--do not vary between sites.

(2) The most important component of direct laboratory costs--people--does not vary between sites; e.g., each laboratory has a facilitator and three aides.

(3) The costs that can vary--materials, supplies, and equipment--are insignificant.

When RENP costs are measured at the classroom level (after allocating laboratory costs among the classrooms served), inter-site variation can and does occur. This variation basically reflects the concentration of laboratory resources among different numbers of teachers. At a nominal level of 12 teachers per laboratory, a variation of one teacher produces about an 8 percent change in the per class cost estimate (roughly $640).

Table A-4 presents costs per teacher trained at each school.

5. Have there been problems in acquiring resources? How have these problems affected RENP?

There have been definite problems in acquiring personnel and other resources in the RENP program. For example:

- Although $12,000 was budgeted for reading materials, few new materials were purchased, received, and in the laboratories as of April.
- The assistant director position was vacant all year because of a lengthy litigation by a former employee.
- Although the installation and operation of a management information system was a condition of the RENP grant, no system has been installed. The District of Columbia Personnel Office has contended that the DCPS has the in-house capability to install and operate the system. DCPS contends that it does not. And there the matter rests.

Anecdotal information can highlight the problem of acquiring resources, but it provides no useful way of quantifying the extent of delay. Further, it provides no insight to the effect delays have had on the program.

To do more on this question would require a detailed analysis of the process by which resources were acquired, essentially auditing the events in resource acquisition for a sample of cases. It would also require a dynamic analysis of each laboratory's status, focusing on the resources actually available at each laboratory. Even then, it is unclear how laboratory "status" would be measured, and ultimately how this information could be related to the effectiveness measures.

Table A-4

COST PER TEACHER IN EXPERIMENTAL SCHOOLS
(dollars)

Experimental School	Cost per Teacher		
	Reading	Mathematics	Both
Birney	8,018	8,717	16,735
Congress Heights	10,691	10,654	21,345
Draper	10,691	--	--
Friendship	9,622	8,717	18,339
Green	--	7,376	--
Hendley	8,747	--	--
Hart	8,748	--	--
Leckie	--	7,991	--
Malcolm X	--	7,991	--
Savoy	--	6,849	--
Simon	8,747	8,717	17,464

6. What is the optimal/desirable level and mixture of resources in RENP?

At the suggestion of NIE, we asked all respondents about their perceptions of the adequacy of RENP resources and what they felt would be a more desirable or optimal level of resources.

There were two significantly different sets of respondents to the questions in this area: RENP management and school-based personnel.

Our interviews with RENP management indicated that they were, on the whole, satisfied with the designed RENP resource configuration. Management had not made any dramatic transfers of funds between budget categories and indicated that future budgets would not differ in character from their current budget. When questioned about materials, supplies, equipment, training, travel, and staffing, they evidenced no problems with the amounts and purposes of these resources. We emphasize that the frame of reference is the designed set of resources and not the actual resources--RENP has had substantial problems, as mentioned previously, in spending its money and getting the resources it needs.

Our interpretation of the interviews leads us to conclude that RENP has matured as a program--that program innovations with significant resource implications are not likely to occur, even if RENP were continued.

School-based personnel, both RENP and non-RENP, had many suggestions concerning the program. We present their comments, from most frequent to least frequent, for the ideas suggested by more than one person and judged relevant to this question. They were:

- more materials and equipment;
- more laboratory time for students; involve more students;
- more facilitators and aides;
- orient parents in individualized instruction;
- continue program all through the school year; and
- pay teachers for RENP training and give them in-service credits.

As stated, these comments represent the essential definition of the thoughts presented. It should be remembered that asking someone about a better or an optimal resource level requires him to formulate some kind of alternative to the RENP model. But school personnel are not in the business of program formulation--they tend to react to deficiencies, not to construct alternatives.

RENP ORGANIZATION

The primary purpose of the chapter is to describe the organizational structure of RENP and to attach costs to that structure. Because personnel account for most of RENP's expenses, an organizational analysis is essentially equivalent to an RENP resource profile. This information is probably of greatest utility to decision-makers considering adoption, in whole or in part, of the RENP model.

RENP Organizational Structure

RENP is structured into four components: management, reading, mathematics, and parent/community involvement.

Overall responsibility for day-to-day operations is vested in a director--currently Daniel W. Jackson. Reporting directly to the director are the assistant directors in charge of reading, mathematics, parent/community involvement, and management services. Others reporting to him are charged with research and evaluation, public information, and resource coordination. One secretary supports the director.

The assistant director for management services supervises an account clerk, an administrative assistant for personnel, a receptionist, an office services supervisor, and a machine operator.

The assistant director for reading is supported by a program assistant and a secretary. All other personnel in the reading component are located

at the various laboratories. Each laboratory consists of a program facilitator and three instructional aides. There are ten reading laboratories, each supporting up to 12 teachers.

The mathematics component is organized like the reading component.

The parent/community involvement assistant director is supported by two community relations specialists, a program assistant, an administrative assistant, a secretary, and two senior community organizers. The administrative assistant is essentially dedicated to supporting the Anacostia Community School Board. The senior community organizers each coordinate five community organizers. There are 10 community organizers. Community organizers are staffed at the rate of one per two laboratories.

Figure 1 displays the organizational structure of RENP. Table A-5 contains a cost analysis of personnel by component, excluding community organizers, facilitators, and aides.

Facilities

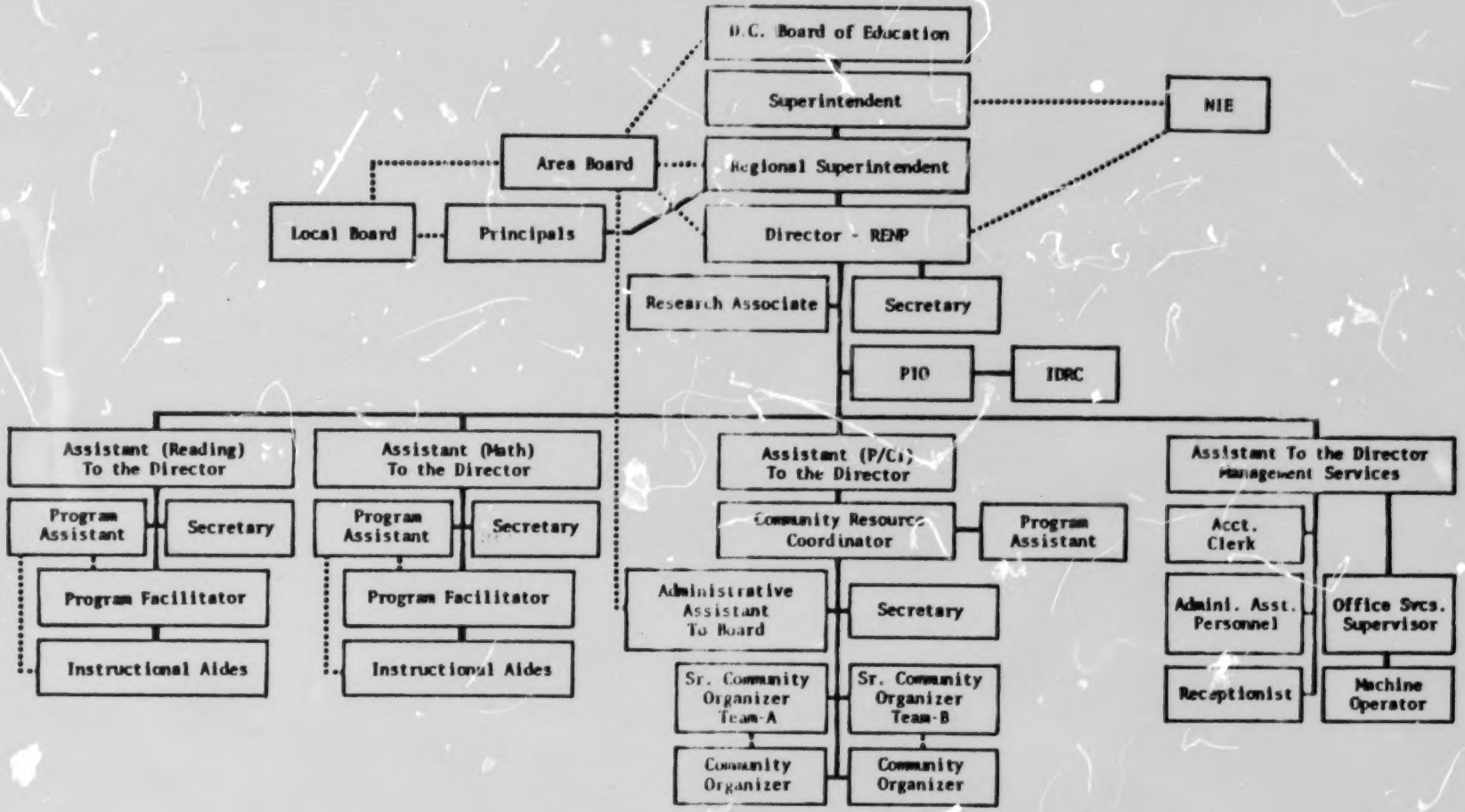
RENP is housed in a modern building in Anacostia. Rental fees include all maintenance and utilities. In Table A-5, the annual rental has been allocated evenly among the four components. There are no other administrative spaces of consequence.

Equipment

Equipment located at the RENP headquarters has been costed and allocated among the four components. This equipment consists primarily of office systems and furniture. Most of the office equipment is owned by RENP. DCPS has supplied about two-thirds of the desks and furnishings.

Miscellaneous Cost Categories

Amounts appearing under travel, office supplies and materials, consultants, and training are based on the Phase II budget for RENP approved by NIE. Because that budget was based on a 13-month program, care was taken to identify which categories should be adjusted and which should not be adjusted when converting to a 12-month year.



A-1

Figure A-1: RESPONSE TO EDUCATIONAL NEEDS PROJECT ORGANIZATIONAL STRUCTURE--1976

Table A-5

RENP ADMINISTRATIVE COSTS
(dollars)

Cost Category	Management	Reading	Mathematics	Parent/ Community Involvement	Total	Percent of Total
Administrative Personnel	191,716	60,799	60,799	114,417	427,731	89.5
Facilities--Rent	5,960	5,960	5,960	5,960	23,840	4.9
Travel						
Local	1,108	276	138	0	1,522	1.4
Out-of-town	923	1,430	0	700	3,053	.5
Office Equipment	2,139	2,139	2,139	2,139	8,556	1.8
Office Supplies and Materials	2,769	923	502	0	4,194	.9
Consultants	5,000	0	0	0	5,000	.9
Training	369	185	100	200	854	.1
Total	209,984	71,712	69,638	123,416	474,750	

Allocation of Administrative Costs

RENP administrative costs can be directly related to the number of laboratories supported. This applies even to parent/community involvement because it is staffed in proportion to the number of laboratories operated. Table A-6 summarizes the costs presented in Table A-5 and distributes them among 20 mathematics and reading laboratories. Assuming 12 teachers per laboratory, Table A-6 indicates that the RENP administrative burden is approximately $2,000 per teacher trained in reading or mathematics. This does not include the DCPS administrative charge.

Reading and Mathematics Laboratories

Both reading and mathematics laboratories are considered in this section because of the similar organizational and operational structures involved.

Each laboratory is organized around a facilitator supported by three aides. At times, consultant personnel are brought in to handle special problems or to provide specialized training. We found no deviations from this staffing pattern in any of the laboratories.

Each laboratory is located in a normal school classroom. In schools with both reading and mathematics laboratories, the laboratories are operated independently and in different classrooms. Generally, no other facilities are dedicated to RENP laboratories. Because of excess space in one school, the RENP laboratories had expanded beyond one room. We have ignored this additional space because it represents an unusual situation that will not exist in the future.

The laboratories are sparsely equipped. In many cases, the only equipment consists of a single tape recorder. The laboratories are usually furnished as classrooms: 20 to 30 student desks, a table, and a teacher's desk is a typical configuration.

We found substantial variation in the quality and quantity of the materials available at the different laboratories. Nevertheless, we did not collect inventory information on the materials at every laboratory because (1) many of the materials were created by teachers and laboratory personnel; (2) materials costs, when amortized and allocated, represent a

Table A-6

SUMMARY OF RENP ADMINISTRATIVE COSTS
(dollars)

Component	Gross Annual Cost	Cost per	
		Reading Laboratory	Mathematics Laboratory
Management	209,984	10,499	10,499
Reading	71,712	7,171	--
Mathematics	69,638	--	6,964
Parent/ Community Involvement	123,416	6,171	6,171
Total	474,750	23,841 (1,986)[a]	23,634 (1,970)[a]

a. RENP administrative cost per teacher trained in reading or mathematics laboratory.

very small percentage of laboratory costs, consequently differences between laboratories are even less significant; and (3) inventories were not available.

Information was collected on what was referred to as a "basic" set of materials for mathematics laboratories (see Table A-7). We constructed a similar list of materials for the reading laboratories. The two lists shown in , Table A-7 formed the basis for the materials cost estimate.

Table A-8 summarizes the principal costs of an RENP laboratory. Basically, there are two costs of importance: personnel and laboratory space. Although laboratory space is free to RENP, we have included it because it represents an expensive resource that may or may not be free in future RENP replications.

Community Organizers

The parent/community involvement component is staffed with one community organizer per two RENP laboratories. Each organizer is associated with two laboratories--one in reading and one in mathematics--which may be in one or two schools. The organizers are not assigned space in the schools or anywhere else. They are not given any specific items of equipment, supplies, or materials. Besides the organizers' salaries, there are only three other important cost items: (1) transportation, (2) janitorial services, and (3) student services. The janitorial services represent costs borne by RENP to clean up school facilities after local school board and Anacostia Community School Board meetings. Student services funds pay Ballou High students to program a computer to support the parent/community involvement component with mailing lists and other computer products.

Table A-9 summarizes the costs associated with community organizers.

Summary of RENP Costs

Table A-10 summarizes the annual costs of operating RENP. A DCPS overhead charge of 6.7 percent has been included as an RENP administrative expense. By including it, we assume that the DCPS is providing services that would have to be purchased otherwise. These services include grant management, budget and expenditures reports, and other functions.

Table A-7

MOST FREQUENTLY USED LABORATORY KITS

Reading Kits

- Sports Close-up
- Improving Comprehensive
- Incredible Series Kit
- Strategies in Study Skills
- Profiles in Black America

Mathematics Kits

- Mr. Math
- Dyna-Math
- Gaining Math Skills
- Individual Instruction in Math
- Telling Time
- The Metric Lab

Table A-8

LABORATORY COSTS

	Cost per Laboratory (dollars)	
	Reading	Mathematics
Personnel		
Facilitator	23,843	23,843
Aides	29,193	29,193
Consultants	220	150
Subtotal	53,256	53,186
Facilities	6,543	6,543
Equipment	44	84
Materials and Supplies	99	100
Miscellaneous	125	25
Total	60,067	59,938

Table A-9

COMMUNITY ORGANIZER COSTS

	Cost per Laboratory (dollars)
Personnel	
Community Organizers	5,345
Consultants	75
Janitorial (budget)	510
Student Programs	450
Facilities	0
Equipment	0
Materials and Supplies (budget)	25
Travel and Training	293
Total	6,698

Table A-10

RENP COSTS BY ORGANIZATIONAL STRUCTURE AND COMPONENT

Category	Percent of Total	Reading (dollars)	Mathematics (dollars)	Parent/ Community Involvement (dollars)	General Management (dollars)	Total (dollars)
Administration						
UCPS	6	--	--	--	112,419	112,419
RENP	24	71,712	69,638	123,416	209,984	474,750
Laboratories	56	535,240	533,950	--	--	1,069,190
Organizers	7	--	--	133,960	--	133,960
Subtotal		606,952	603,588	257,376	322,403	1,790,390
Laboratory Space	5	65,430	65,430	--	--	130,860
Total		672,382	669,018	257,376	322,403	1,921,179

The costs as a percentage of the subtotal basically reflect the flow of money into RENP. The data indicate that approximately 30 percent of the grant is spent in administration, with DCPS receiving 6 percent and RENP using 24 percent. It should be noted that many of the costs classified as RENP administration contribute substantially to the program. For example, much of the RENP equipment is classified as administrative, when it is largely devoted to producing mailings, handouts, and presentations. A more conservative estimate of RENP administration might include just the general management costs, which account for 12 percent of the budget. In any case, RENP is devoting between 18 percent and 30 percent of its resources to management functions.

Table A-11 is another analysis of RENP based on resource categories (including laboratory space costs). It shows that RENP personnel costs account for 85 percent of the budget, far overshadowing the DCPS administrative charge of 6 percent and the facilities cost of 8 percent. If we exclude the laboratory space costs, the percentage of funds devoted to personnel rises to 91 percent. The two tables basically indicate that equipment, materials, supplies, travel, and other minor categories constitute insignificant RENP cost components.

To estimate what it might cost to replicate RENP in other situations, is it necessary to identify the fixed and variable costs in RENP. Referring to Table A-10, laboratories, organizers, and laboratory space are variable costs. The DCPS overhead charge is variable because it is based on a percentage of the program cost. RENP administration is partially fixed. Although it is not possible to speculate on how the administrative structure would change for much larger or much smaller replications, it appears that for small changes the administrative costs in reading, mathematics, and management can be taken to be fixed. Parent/community involvement administration is partially variable because its staffs senior community organizers in relation to the number of community organizers (1:5). Based on these assumptions, $73,600n + $450,000 reasonably approximates the total cost of RENP, where n is the total number of laboratories operated (assuming equal numbers of mathematics and reading laboratories). The additional cost of a laboratory is about $73,600. Fixed costs comprise about $450,000.

Table A-11

RENP COSTS BY COST CATEGORY

Category	Cost (dollars)
Personnel	
Professional Staff	1,595,351
Consultants	10,200
Other	19,200
Subtotal	1,628,391
Facilities	154,700
Equipment	9,784
Materials and Supplies	6,784
Travel and Training	12,789
DCPS	112,419
Total	1,921,179

APPENDIX B

COST METHODOLOGY

APPENDIX B

COST METHODOLOGY

THE RESOURCE APPROACH TO COST ANALYSIS

The cost of an educational program can be estimated in several ways. One could, for example, examine the latest budget and use the "bottom-line" figure. Or, one could look at the latest expenditure figures and annualize them to a full year. Or, one could construct a detailed analysis of the resources used in the program, apply prices to the resources, and generate cost estimates based on these quantities and prices. Generally, we have taken the latter approach, although in some instances we have used budgetary expenditure data.

Budgetary data are usually inappropriate for program evaluation. In the case of this study, several anomalies were present in the budgets:

- Because the program is terminating, certain personnel were retained for only 11 months of the budget period while other personnel were retained for 13.
- The budgetary data were insufficiently detailed to allow us to examine the effect of different salaries, different assumptions about vacancy rates, and subdivisions of the line items.
- The materials budgets include costs for equipment bought in the budgeted year. These numbers are extremely unstable. For example, the RENP reading materials budget was $12,000, while the mathematics budget was only $5,000. Nevertheless, the mathematics laboratories, with inherited materials purchased in previous years, are better supplied than the reading laboratories.
- Budgetary data are difficult to use when making inter-LEA comparisons because of differences in line-item definition and other accounting practices.

- Certain line items were not intrinsic program costs. For example, a $35,000 item to pay off accrued vacation time would not normally be as high if tight management control over vacation time were exercised and if the program were not terminating.

Budgetary data are useful in certain circumstances, however. In this report we have used budgetary data in lieu of a resource inventory for items like office supplies, laboratory supplies, travel, and similar items. These items basically have short useful lives; consequently, there is little problem with inherited resources. In the case of supplies, a great deal of effort would have been required to inventory the myriad items and to gather price information. Furthermore, the payoff for this effort seemed low, especially since our experience indicates that these inventories are quite unstable, reflecting the effects of batching of orders, late deliveries, uneven use, etc.

One feature of the resource approach to cost analysis is that it produces a quantified list of the resources used by a program. Not only is the resource list of interest to educators, it is also of particular importance to local decision-makers contemplating alternative programs. Because D.C. prices were used, the cost estimates presented in this report are of limited use to other LEA decision-makers when they are investigating the cost impact of an RENP program on their budgets. However, the availability of specific resource information, beyond simple cost estimates, permits them to develop cost estimates that accurately reflect what they will have to pay for various resources. In addition, it allows them to determine the availability of resources that are free or that will be provided regardless of whether the program is implemented.

Types of Costs Considered

The cost-estimating procedures used in this study were directed toward identifying the total cost of providing education in each school examined. Every effort was made to collect data on all personnel, facilities, equipment, materials, supplies, and services involved in the educational process in the sampled schools. Nevertheless, certain costs that DCPS must pay are only incidentally associated with either RENP or the services provided to children. Two prime examples are the administrative costs of

operating the DCPS (payroll department, bookkeeping, supplies, and materials ordering department, etc.) and the costs of transporting children to and from school. Such activities, although essential for efficient operation, are not a direct part of the program. Including these costs in our examination would have greatly increased the complexity of the data collection without changing the results because both the experimental and control schools would have been equally affected. Therefore, such costs were excluded from the study; only those resources that directly affected the program were considered.

It was not possible to accurately estimate the DCPS's cost to provide the services excluded from this study because they were not examined. However, statistics published by NCES[1] indicate that administrative costs represent approximately 3.9 percent of total costs and transportation represents 3.1 percent of total costs, when averaged across the nation. Thus, it appears that the costs identified in this study represent between 90 and 93 percent of the total cost of the educational programs. The exclusion of these cost categories does not affect estimates of the differences between experimental and control schools. It should be noted that DCPS imposes an explicit 6.7 percent administrative burden on the RENP program, and this cost has been included.

Total Versus Incremental Costs

Education costs can be examined in two ways. The first is referred to as total cost, or the total value of all resources used to operate a program. All resources--regardless of when they were purchased or who paid for them--must be considered. These resources not only include those directly associated with the educational program, but also those that have some impact on a program even though they might be provided to all children in the LEA. All equipment used in the program has some value and should be included even if it was purchased in a previous year for another program. Services provided free of charge because they are either volunteered or paid for by other community agencies are also included.

1. Statistics of State School Systems, 1971-72, National Center for Educational Statistics (NCES 75-153), 1975.

A second type of cost estimate is the incremental cost of the program. The incremental cost considers only the additional program resources that are not normally provided to classrooms. In a sense, the incremental cost measures the special resource requirements of implementing a program. All resources included in the incremental cost are also included in the total cost. Thus, the incremental cost is always less than the total cost of a program.

In evaluating alternative programs, the incremental cost is of most interest because it represents the additional resources required to implement a program. When faced with the decision about whether or not the program should be implemented, the LEA must consider how it will provide those additional resources. If they cannot be provided free (either inherited or volunteered), the LEA must find state or federal funding or increase its own budget to cover the additional cost.

Unit of Analysis

The classroom has been selected as the basic unit of analysis in this study, although sometimes costs will be expressed on a per pupil basis. The classroom was selected for several reasons:

(1) RENP is oriented toward teachers; for the sample drawn, teachers and classrooms are equivalent.

(2) The analysis methods employed in this study were insensitive to variations in the resource levels applied to pupils within the same class. Even if costs were expressed on a per pupil basis, this number would not vary between pupils in the same class. Thus, no information is lost by using a per class measure.

(3) Other studies of compensatory education costs have used the classroom as the unit of analysis.[1,2]

Base-Year Prices

The prices presented in this report represent the best estimates for the 1976 school year. Considering the rapid increase in prices arising from inflation in recent years, these price estimates are not appropriate

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1. D. Rogers, et al., Cost Analysis of Follow Through Projects (Bethesda, Maryland: RMC Research Corporation, 1977).

2. P. Dienemann, et al., An Evaluation of the Cost Effectiveness of Alternative Compensatory Reading Programs (Bethesda, Maryland: RMC Research Corporation, 1974).

for prior years. Likewise, it is reasonable to assume that, if no reduction is made in the quantity of resources employed in RENP, the prices in future years will be higher than those reported here. However, applying inflation factors to the study results should produce reasonably accurate cost estimates in the future.

THE COST MODEL

Resources that support RENP and DCPS programs are available in many places besides the classroom. These resources include RENP administration, school administration, personnel shared by classes, RENP laboratories, etc. To calculate a summary cost per class figure for each class, it is necessary to determine what portion of a resource benefits an individual classroom. The determination of these portions is called an allocation procedure. It is the basic structure of a cost model.

Allocation Procedures

We have structured the allocation rules according to resource type. Resources are either (1) RENP-provided resources, or (2) resources provided from other sources. The following rules are default conditions--that is, they basically describe how we allocated a resource when we could not gather information on its actual allocation. For example, an instructional aide was allocated evenly among the classes served by the laboratory unless unequal support levels were indicated. Although we did not ask each of the several hundred people how they spent their time, we did ask key individuals (component heads, facilitators, principals) who would be expected to know of any special allocations.

RENP Resources

RENP resources can be found at the administrative headquarters, at school-based laboratories, and in the person of community-based organizers. Four administrative activities take place at the administrative headquarters: general management, reading component management, mathematics component management, and parent/community involvement management. General management includes DCPS overhead charges.

> Rule 1: Allocate general management costs equally among the three functional components.

Adding in the prorated general management charges to the component management charges yields the gross management cost for each component.

> Rule 2: Allocate gross component management costs equally among the laboratories (organizers) of the component.

RENP administrative personnel confirmed that this was a reasonable procedure. Each laboratory's (organizer's) share of the component management costs plus the costs directly associated with the laboratory (organizer) yield the total laboratory (organizer) cost. Many of the tables in this report are presented at this level.

> Rule 3: Divide laboratory costs equally among the teachers served by the laboratory.

This yields the cost per class of RENP-provided resources.

Because their clientele includes parents, students, teachers, and the community, it is difficult to tie the work of community organizers to classroom teachers. Nevertheless, it is useful to do so, and a reasonable method is available.

> Rule 4: Divide the total organizer costs between the two laboratories the organizer is associated with, and then among the teachers served by each laboratory.

These four rules allow one to examine costs in a number of ways and at a number of analytical levels.

Other Resources

Other resources can be classified as (1) located in the classroom, (2) shared by classrooms, or (3) shared between classrooms and between schools.

Rule 5: Classroom costs are not allocated.

Rule 6: Resources shared between schools (generally personnel) are allocated in proportion to the amount of time spent in each school.

Rule 7: Resources shared by classes are allocated uniformly among the classes served unless otherwise indicated.

We are not interested in every resource in the schools--only in the resources used by or affecting the sampled classrooms. For example, if we have a fourth-grade classroom in our sample and there is a reading teacher serving only grades 1 to 3, then that teacher is ignored.

Problems with Junior High Schools

Junior high schools present quite difficult cost analysis questions. Unlike the elementary school classes in the sample, the junior high homerooms are together for only one period of the day. The distinction between RENP and non-RENP students is not really meaningful because students from RENP homerooms are taught by non-RENP teachers and vice versa. In addition, from a resource perspective, each student in a homeroom receives a different mix of resources, depending on the student's courses. For example, one student in a homeroom might benefit from the extensive resources of a science laboratory, but another might not.

We have used the number of homerooms in the junior high school as the number of classes in that school. Additionally, we have assumed that each homeroom is taught by one teacher. School personnel remaining after eliminating teachers assigned to homerooms are allocated uniformly among the classes. Audio-visual equipment and office equipment are allocated similarly. Items such as science laboratory equipment, shop equipment, music equipment, and classroom materials are not considered.

These adjustments, although crude, do not severely affect the analysis. The primary result is that (1) we will tend to understate costs at junior highs more than at elementary schools; and (2) we cannot differentiate the cost of classes within a junior high school. Nevertheless, the procedure

introduces no apparent biases into our sample because it affects RENP and control schools equally. Furthermore, these comments do not apply to RENP-provided resources. Both the RENP resource inventory and its target teachers are well-defined in the junior high schools.

Unit Costs

For all elements of the RENP program, costs can be categorized as either:

- capital investments, or
- annual operating expenses.

Capital investments are the one-time expenditures needed to initially implement a program. They include costs for new facilities, equipment, materials, and extraordinary staff training. If a program is totally new, the capital costs might also include one-time expenditures for program design and development of materials.

By contrast, annual operating expenses are the costs incurred each year to operate and maintain a program. They include expenses for salaries, in-service training, materials and supplies, equipment maintenance, facilities operations and maintenance, and other services related to the program. These two broad categories of cost--capital investment and annual operating--are used as the basis for organizing the cost elements.

Treatment of Capital Costs

The primary distinction between capital and operating costs is the length of time benefits are derived from each type of expenditure. Capital resources last many years, while annual expenditures buy resources that are consumed in less than a year. To facilitate making cost comparisons, we need to annualize the capital investment pattern.

The best procedure for making the two costs comparable is to convert the capital investment costs into a series of uniform annual expenditures. Capital costs are amortized over their useful lives by using the following formula:

$$\text{Equivalent Annual Cost} = \text{Resource Price} \times \text{Capital Recovery Factor},$$

where

$$CRF = i(1+i)^n/[(1+i)^n - 1],$$

n = useful life, and

i = discount rate.

The annualized capital costs computed in this manner can be combined with the other annual operating expenses to give total annualized program costs. The advantages of amortized costs, however, must be weighed against the need to estimate useful lives and discount rates.

It must be remembered that there are annual operating cost expenditures associated with capital resources. Examples of these operating expenses include costs of operating facilities, maintenance and repair expenses of facilities and equipment, as well as the purchase of replacements and spare parts.

Facilities

We were unable to gather accurate estimates of the cost per square foot of classroom space in the D.C. Public Schools. For the purposes of this report, we are relying on data gathered by RMC in 1975 on construction costs in the Montgomery County, Maryland, school system. Because the two school jurisdictions are adjacent, it is reasonable to expect that they are faced with approximately the same costs for construction. Thus, the Montgomery County estimates should be applicable to the DCPS.

The Montgomery County school system keeps quite detailed records on the construction and utilities costs for each of its schools. We obtained access to this information and analyzed the construction costs of two newly constructed elementary schools. Construction costs--including architectural fees, site development, and building construction--amounted to $40.55 per square foot. This per-square-foot cost did not include the cost of land or the cost of furniture or equipment included in the builder's fee. These two costs were omitted because the life of land is infinite--it does not depreciate--and because the cost for furniture and equipment is dealt with elsewhere in this report.

An additional aspect of space cost is that not all of the available space is actually used for instructional purposes. Substantial amounts of space are required for storage, toilets, corridors, lobbies, and mechanical equipment. Using the data collected from Montgomery County and our judgment about the amount of direct support space, we estimated that 25

percent of the square footage was used for support purposes. By allocating the cost of this 25 percent over the classroom space, we arrived at a total cost of $54.07 per square foot of classroom space.

Annual operating costs for Montgomery County schools include the cost of utilities, the cost of custodial services, and the costs of security and operations and maintenance. An analysis of 10 elementary schools in Montgomery County showed these costs to be $1.60 per gross square foot. After reallocating support space, we arrived at a figure of $2.46 per square foot for the annual operating costs of facilities space.

We assume that the life of a school is 50 years and the discount rate is 7 percent.

The following prices resulted:

- $54.07 per net square foot for construction costs or capital costs.
- $2.46 per net square foot for annual operating costs.
- $6.38 per net square foot for total annualized costs.

The prices described above are based on 1975 data. Because of inflationary effects, we have inflated these costs by 14 percent, corresponding roughly to increases of 8 percent in 1975 and 6 percent in 1976. The resultant figures are:

- $61.84 per net square foot (capital costs).
- $2.80 per net square foot (operating expenses).
- $7.27 per net square foot (total annualized costs).

Classroom sizes average about 30 feet by 30 feet.[1] And the RENP laboratories are located in dedicated classrooms. Consequently, the space costs for RENP laboratories, experimental, and control classrooms is:

$$\$7.27 \times 900 = \$6,543/\text{room/year}.$$

This analysis applies only to owned facilities. Rented facilities, such as the RENP offices, are costed at the annual rent plus maintenance and utilities.

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1. This was the standard classroom size used in A Cost Analysis of Follow Through Projects.

Furniture and Fixtures

Several methods were used to determine the capital costs of furniture and furnishings. In general, we sought to determine costs that reflected the prices DCPS pays and that were as current as possible.

The first source of price information was an untitled memorandum produced by the DCPS Budget Department that listed actual prices for a large number of furniture, fixtures, and equipment items. If an item was not on that list, several sources were consulted, depending on the nature of the item. The sources included 1977 office supply catalogs from local firms,[1,2] a directory of audio-visual equipment,[3] a three-volume analysis of office systems,[4] and previous RMC studies.[5,6]

Table B-1 displays selected resources, estimated prices, estimated life spans, and annualized costs. A 7 percent discount rate is assumed.

Equipment

Unit prices for equipment items were developed in a manner similar to the one used for developing the unit prices of furniture items. The life, capital investment cost, annual operating cost, and total annualized cost were determined for each equipment item and are displayed in Table B-2. The annual operating costs for equipment items consist primarily of maintenance costs. Maintenance costs for equipment items were assigned based on a percentage of the capital investment costs. Three somewhat arbitrary categories of maintenance requirements were used for analytical convenience. Equipment items requiring no maintenance at all were given an annual operating cost of $0.00; equipment items requiring limited

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1. Ginn's 1977 Office Supply Catalog, Washington, D.C.

2. Delta Office Supplies 1977 Catalog, Gaithersburg, Maryland.

3 The Audio-Visual Directory 1976-1977 (Fairfax, Virginia: National Audio-Visual Association, 1977).

4. N.J. Delran, Office Systems, Vols. I, II, and III.

5. N. Al-Salam, et al., Evaluation of the Field Test of Project Information Packages, Vol. III: Resource Cost Analysis (Bethesda, Maryland: RMC Research Corporation, 1975).

6. A Cost Analysis of Follow Through Projects.

Table B-1

STANDARDIZED COSTS FOR FURNITURE AND FIXTURES

Furniture and Fixtures	Life (years)	Capital Investment Cost (dollars)	Total Annualized Cost (dollars)
REGULAR			
Adult Chair	20	55.00	5.19
Professional Desk	20	230.00	21.62
Student Desk and Chair	10	28.80	4.09
Tables	20	34.00	3.20
Chairs	15	8.00	.88
File Drawers	15	30.89	3.39
Bulletin Board	20	72.91	6.85
Cabinet	20	110.00	10.34
Blackboard	20	65.67	6.17
Typing Stand	10	70.00	9.94
Map Display	10	50.00	7.12
Partition	10	160.00	22.72
Portable Stairs	20	100.00	9.44

Table B-2

ANNUALIZED EQUIPMENT COSTS

Equipment Type	Life (years)	Capital Investment Cost (dollars)	Annual Operating Cost (dollars)	Total Annual Costs (dollars)
OFFICE				
Calculator	5	233.00	11.65	68.50
Coffee Machine	3	40.00	0.00	15.24
Dictaphone	10	400.00	20.00	76.80
Lectern	10	137.00	6.85	26.30
Typewriter: Selectric	10	900.00	45.00	172.80
Royal Electric	10	500.00	25.00	96.00
PRODUCTION OF MATERIALS				
Ditto Machine	5	350.00	17.50	102.90
Duplicating Machine	5	485.00	24.25	142.59
Mimeograph	5	700.00	35.00	205.80
3M Thermofax	10	450.00	22.50	86.40
3M 209 Autocopier	10	2,070.00	103.50	397.44
Transparency Maker	5	400.00	20.00	117.60
Typewriter (primary)	20	275.00	13.75	52.80
Drymount Press	15	211.00	10.50	33.77
Photoflat Weight	20	19.00	0.00	1.79
Paper Cutter	20	17.00	0.00	1.60
SOUND AND SOUND PRODUCTION				
Cassette Player	5	59.00	2.95	17.35
Cassette Player/Recorder	5	85.00	4.25	24.99
Reel to Reel Recorder	10	227.00	34.05	66.48
Record Player	10	62.00	3.10	11.90
Listening Center (10 station)	5	65.00	3.25	19.11
Phono Radio Cassette	5	320.00	16.00	94.08
Stereo Radio	10	80.00	4.00	15.36
Tape/Synch-Mixer	10	68.00	3.40	13.07
Amplifier-Mixer	10	29.00	1.45	5.57
Bulk Tape Eraser	15	14.00	0.00	1.54
VIEWER AND PROJECTION				
Slide Projector	10	87.00	13.05	25.40
Overhead Projector	10	137.00	6.05	26.30
Opaque Projector	10	385.00	19.25	73.92
Filmstrip Projector	10	87.00	4.35	16.70
Filmstrip Viewer	10	27.00	1.35	4.32
Filmloop Projector	5	130.00	6.50	38.22
Movie Screen	10	40.00	0.00	5.68
Microfilm Reader	10	211.00	10.55	40.51
SOUND AND VISUAL				
Cassette/Filmstrip Projector	5	245.00	36.75	96.53
Spellbinder	-	--	0.00	--
Sound/Filmstrip Viewer	5	211.00	31.65	83.13
16MM Projector	10	750.00	37.50	144.00
Television	5	117.00	5.85	34.40
Video Tape Equipment	10	2,900.00	145.00	556.80
PHOTOGRAPHIC				
Camera: Super 8	5	388.00	19.40	114.07
Instamatic	3	40.00	0.00	15.24
Tripod	10	57.00	0.00	8.09
Ektographic Visual Maker	5	125.00	0.00	30.50
SPECIAL READING MACHINES				
Language Master	10	268.00	13.40	51.46
Controlled Reader	5	279.00	41.85	109.93
Tach-X	10	245.00	12.25	47.04
Audio Card Reader	5	217.00	32.55	85.50
Hoffman Machine	5	445.00	66.75	175.33
Singer Readermate	10	171.00	25.65	49.93
Vocom	10	137.00	20.55	40.04
Timers	1	9.00	0.00	9.00
SPECIAL MATH AND OTHER INSTRUCTIONAL				
Calculator	5	36.00	1.80	10.58
System 80	5	500.00	25.00	147.00
Tutor Computer	10	1,368.00	68.40	262.57
Mathiputer	5	285.00	14.25	83.79
Telebinocular	10	382.00	19.10	73.34

maintenance were assigned an annual operating cost of 5 percent of their capital investment costs; and equipment items requiring substantial maintenance were given an annual operating cost equal to 15 percent of their capital investment costs.

Total annualized costs for equipment items were equal to the sum of the capital investment costs amortized over the life of the equipment at an annual interest rate of 7 percent plus the annual operating costs.

Materials

Three classes of materials were identified in this study: library books, textbooks, and kits. We used a 10-year depreciation schedule and a 7 percent discount rate for materials. We assumed zero maintenance costs for books and a 5 percent maintenance cost for kits. We used current kit prices; for textbooks, we used an average price based on previous cost studies.[1] Table B-3 summarizes the costs derived.

Personnel

Estimating total annual salaries for various types of personnel is much simpler in the RENP study than in other compensatory education cost analyses. This is because a single set of job classifications is in force--there is no worry that the same function at two schools is performed by personnel with different job titles. Accordingly, we used the job titles observed in our field work. The job titles and total annual compensation figures used are shown in Table B-4.

For RENP employees, each job is associated with a particular grade and salary schedule. We used the most recently computed average annual salary, including the benefits for that grade and schedule (from DCPS Budget Department information).

For other personnel except classroom teachers, we computed an average salary from the DCPS FY 78 budget. This procedure covered 95 percent of the job classifications. Salary information for health personnel (MDs, dentists) was derived from RMC's cost analysis of Follow Through projects.

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1. A Cost Analysis of Follow Through Projects.

Table B-3

MATERIALS COST

Resource	Annualized Cost (dollars)
Textbooks	0.72
Library Books	0.50
Kits	18,23
Workbooks	2.42
Cuisanaire Rods	17.09

Table B-4

FULL ANNUAL SALARIES BY JOB CLASSIFICATION

Title	Cost (dollars)
RENP PERSONNEL	
Director (TSA-5)	30,173
Assistant Directors--Reading, Mathematics (TSA-8)	25,354
Assistant Director, Management (GS-12)	24,578
Parent/Community Involvement Programs Assistants--Reading, Mathematics (TSA-10)	23,843
Facilitators--Evaluation (TSA-10)	23,843
Resource Coordinator--Public Information (GS-11)	20,607
Administrative Assistant for Personnel (GS-7)	14,437
Account Clerk	
Program Assistant, Parent/Community Involvement	
Secretary to Director (GS-6)	13,532
Administrative Assistant, Parent/Community Involvement	
Office Services Supervisor (GS-5)	11,602
Community Relations Specialist	
Secretaries	
Community Organizers	
Institutional Aides (GS-4)	9,731
Receptionist (GS-3)	8,950
Machine Operator	
OTHER PERSONNEL	(see schedule)
Classroom Teachers	9,731
Teacher Aide	9,731
Parent Volunteer	9,731
Other Volunteer	16,833
Mathematics Specialist	17,656
Reading Specialist	17,747
Librarian	9,785
Clerk/Tester	22,330
Staff Developer/Site Coordinator	9,837
Secretary	27,292
Principal	24,081
Assistant Principal	41,500
Physician	17,624
Psychologist	17,844
Psychometrist	41,500
Psychiatrist	17,844
Hearing Therapist	41,500
Dentist	41,500
Optometrist	15,974
Nurse	15,974
Dental Hygienist	15,974
Nutritionist	17,844
Attendance Officer	17,312
Other Teachers	17,594
Social Worker	17,844
Speech Therapist	17,747
Guidance Counselor	9,731
Non-Instructional Aide	

For classroom teachers, we used individual annual compensation. These salaries are based on education and years of experience. The salary schedule used is shown in Table B-5.

Table B-5

CLASSROOM TEACHER SALARY SCHEDULE
(dollars)

	Years of Service													
	Less than 1	2	3	4	5	6	7	8	9	10	11	12	13	More than 14
TSA-15														
Group A, Bachelor's Degree	10,536	10,955	11,374	11,793	12,311	12,630	13,1[illegible]	13,690	14,220	14,750	15,280	15,810	16,340	17,612
Group A-1, Bachelor's + 15	11,061	11,480	11,899	12,317	12,736	13,155	13,685	14,215	14,745	15,275	15,805	16,335	16,865	18,667
Group B, Bachelor's +30, MA	11,591	12,121	12,651	13,181	13.711	14,241	14,898	15,556	16,213	16,870	17,527	18,184	18,842	20,553
Group C, Master's Degree + 30	12,121	12,651	13,181	13,711	14,241	14,771	15,428	16,086	16,743	17,400	18,057	18,714	19,372	21,094
Group D, Master's + 60, Doctor's	12,651	13,181	13,711	14,241	14,771	15,301	15,958	16,616	17,273	17,950	18,587	19,244	19,902	21,783

APPENDIX C

SAMPLE AND DATA COLLECTION

APPENDIX C

SAMPLE AND DATA COLLECTION

SAMPLE

The sample was selected by the DCPS Division of Research and Evaluation. Drawn entirely from the Anacostia Project Schools, it comprised ten experimental elementary schools, an experimental junior high school, eight control elementary schools, and a control junior high school. Within each elementary school, one or more classes in grades 4 to 6 were included in the sample. The junior high classes were all from grade 8. No senior high school classes were in the sample selected. Table C-1 displays the distribution of classes by school for the control and experimental schools.

DATA COLLECTION

Five data collection guides were developed for the study. They dealt with:

- RENP reading,
- RENP mathematics,
- RENP parent/community involvement,
- RENP office/administration, and
- the schools and classrooms in the sample.

A primary interviewee was identified for each guide. It was the component director in reading and mathematics; the RENP director in parent/community involvement and office/administration (the parent/community involvement director position was vacant), and the principal in each school. In addition to the primary interview, other interviews were conducted to provide data that the primary interviewee was unable to supply

Table C-1

DISTRIBUTION OF SAMPLE CLASSES BY GRADE AND SCHOOL

Schools	Grades				
	4	5	6	7	8
EXPERIMENTAL					
Birney	1				
Congress Heights		2	1		
Draper	1	1			
Friendship			1		
Green	1		1		
Hart					9[a]
Hendley		2			
Leckie	2				
Malcolm X		1			
Savoy			1		
Simon		1	1		
Subtotal	5	7	5		9
CONTROL					
Johnson					6
Ketcham	1				
McGogney			1		
Moten	3	1	2		
Patterson	1				
Randle Highlands	1	1	1		
Stanton			1		
Turner		1			
Washington Highlands			2		
Subtotal	6	3	7		6

a. Only six homerooms were used.

accurately. When costing the reading and mathematics components, RMC field workers visited the laboratories and spoke with facilitators and aides. At the schools, RMC often interviewed classroom teachers. At RENP, information was supplied by many people.

In addition to the data collected through RMC's interviews, a great deal of information was compiled from other sources. This information included budgetary, contractual, and expenditure data from NIE, many analyses conducted by the DCPS Division of Research and Evaluation, and a great deal of budgetary data from the DCPS Budgetary Department. Finally, RENP supplied many past quarterly reports, as well as current expenditure, inventory, and budgetary information.

Nonresponse was not a significant problem in this study. In general, RMC interviewers received excellent cooperation from the primary and secondary interviewees. There were, however, isolated problems:

- One control elementary school principal would not cooperate--no data from that school has been used in this analysis. It poses no apparent problem to our analysis.

- There were several instances of item nonresponse. The most significant type occurred when an interview in the school was conducted with the principal, but information regarding one or more sample classroom teachers was not provided. We observed no apparent pattern to this nonresponse, except that homeroom teacher information was not available for any of the sample teachers in the control junior high. We adjusted for this factor in our comparison of teacher salaries by not considering experimental teacher salaries in the average. Overall, we received classroom teacher information on 88 percent of the experimental teachers and 68 percent of the control teachers. Excluding the control junior high teachers, we received 94 percent of the control teacher information sought.

APPENDIX D

DETAILED COST DATA

Table D-1

RESOURCE DATA FOR ALL CLASSES IN THE SAMPLE

Schools	ID	Grade/ Classes	Code[1]	Number of Students	Meals		Book			Field Trips	Teacher	
					Breakfast	Lunch	Reading	Math	Other		Experience Years	Education
Birney	1-1	4-1	3	26	26	26	30	35	101	6	33	BA + 15
Congress	2-1	5-1	3	22	10	10	22	22	-	5	9	BA
		5-2	3	21	12	12	20	21	21	1	5	BA + 15
		6-1	3	30	10	10	30	30	-	3	18	MA + N
Draper	3-1	4-1	1	25	18	18	25	25	50	2	10	MA + 12
	-	5-1	1	24	21	21	24	48	24	3	9	BS + 11
Friendship	4-1	6-1	3	24	10	14	0	0	0	3	9	MA + 9
Green	5-1	4-1	2	25	18	18	12	-	4	10	20	MA + 60
		6-1	2	19	12	12	21	21	63	4	19	BA + 15
Hart	6-1	8-1	3	-	-		-	-	60	0	9.5	
		8-2	3	-	-	-	-	-	-	-	8	BS + 30
		8-3	3	26	-	-	36	0	99	0	5	BS + 5
		8-4	3	18	-	-	-	18	-	0	15	BS + 45
		8-5	3	-	-	-	-	-	1	1	11	BS
		8-6	3	26	-	-	150	-	-	2	11	BA
Hendley	7-1	5-1	1	30	20	20	30	42	90	1	12	BS + 8
		5-2	1	30	20	20	30	30	150	3	8	BA + 15
Johnson	8-2	8-1	0	-	-	-	-	-	-	-	-	-
		8-2	0	-	-	-	-	-	-	-	-	-
		8-3	0	-	-	-	-	-	-	-	-	-
		8-4	0	-	-	-	-	-	-	-	-	-
		8-5	0	-	-	-	-	-	-	-	-	-
		8-6	0	-	-	-	-	-	-	-	-	-
Ketcham	9-2	4-1	0	33	7	25	35	27	83	5	26	MA + 30
Leckie	10-1	4-1	2	26	10	10	-	41	62	4	26	BS + 14
		4-2	2	25	10	10	0	75	60	4	25	BS + 15
Malcolm X	11-1	5-1	2	32	16	32	24	15	25	9	32	MA
McGogney	12-2	6-1	0	29	15	15	32	33	-	6	10.5	BA
Moten	13-2	4-1	2	28	18	18	88	28	28	4	6	BS + 15
		4-2	2	28	25	25	75	15	68	4	11	BA + 15
		4-3	2	29	21	21	103	38	28	4	4	BA
		5-1	2	28	-	-	94	21	87	6	14	BA + 15
		6-1	2	25	-	-	104	31	95	6	16	BA
		6-2	2	28	-	-	128	30	28	6	21	BA

Table D-1

RESOURCE DATA FOR ALL CLASSES IN THE SAMPLE

(continued)

Patterson	14-2	4-1	0	26	13	9	26	26	75	1	10	MA + 15
Randle Highlands	15-2	4-1	0	-	18	18	16	20	60	5	11	BS + 20
		5-1	0	29	19	19	31	31	-	4	12	BS
		6-1	0	-	4	18	28	25	54	11	8	MA
Savoy	16-1	6-1	2	29	26	26	29	29	58	2	6	MA
Simon	17-1	5-1	3	28	15	15	28	28	61	2	26	BS
		6-1	3	23	6	6	24	24	24	4	7	BS
Stanton	18-2	6-1	0	27	19	19	189	0	0	3	10	MA
Turner	19-2	5-1	0	-	-	-	-	-	-	-	-	-
Washington Highlands	20-2	6-2	0	25	20	20	135	30	72	5	8	MA + 20
			0	24	22	22	26	32	50	6	4	MA + 15

NOTES:

1. Codes
   - 0 = Non-RENP
   - 1 = RENP - Reading Labs
   - 2 = RENP - Math Labs
   - 3 = RENP - Both Labs
2. A dash (-) indicates the school did not report this value.

Table D-2

ENROLLMENT IN SAMPLE SCHOOLS

School	Total Classes	Enrollment	Pupils Per Class
1-1	34	794	23.35
2-1	25	689	27.56
3-1	20	537	26.85
4-1	45	988	21.96
5-1	29.5	854	28.95
6-1	49	1,722	35.14
7-1	29	813	28.03
8-2	41	1,440	35.12
9-2	30	786	26.20
10-1	25	708	28.32
11-1	36	782	21.72
12-2	24.5	694	28.33
13-2	56	1,688	30.14
14-2	20	573	28.65
15-2	17	465	27.35
16-1	24	803	33.46
17-1	25	738	29.52
18-2	28	780	27.86
19-2	33	1,008	30.55
20-2	37	996	26.92

Table D-4

SCHOOL COSTS FOR BOOKS AND SUPPLIES

School	Classes	Textbooks	Supplies	Periodicals	Library Books	Number of Library Books
1-1	34	$ 5,820	$ 8,000	$ 300	$ 2,000	3,300
2-1	25	5,287	6,985	246	1,357	6,550
3-1	20	4,000	6,000	0	0	6,000
4-1	45	---	---	---	---	952
5-1	29.5	6,254	8,500	250	1,300	3,000
6-1	49	---	---	---	---	10,094
7-1	29	8,690	8,000	200	360	4,910
8-2	41	---	7,000	---	---	---
9-2	30	5,068	8,093	350	1,650	1,549
10-1	25	0	4,785	0	920	4,000
11-1	36	3,350	7,000	100	5,700	4,604
12-2	24.5	500	5,500	0	500	---
13-2	56	0	13,000	0	0	1,200
14-2	20	2,074	5,960	1,000	0	3,699
15-2	17	1,000	4,688	80	500	4,650
16-1	24	1,000	8,237	100	1,000	7,292
17-1	25	2,000	7,519	150	1,200	6,805
18-2	28	4,000	7,600	300	700	8,000
19-2	33	1,000	10,000	500	2,500	2,000
20-2	37	5,000	9,000	319	1,000	1,765

Table D-3

COST PER CLASS FOR NON-RENP SCHOOL PERSONNEL

School	Total Classes	Administrative	Non-Instructional	Reading and Math	Other Instructional Support	Total
1-1	34	$ 2,232	$ 513	$ 630	$ 2,558	$ 5,933
2-1	25	2,644	1,073	282	4,865	9,464
3-1	20	2,345	2,178	946	4,150	9,619
4-1	45	2,956	938	392	3,320	7,606
5-1	29.5	2,572	1,275	598	2,950	5,095
6-1	49	3,223	1,079	---	9,663	---
7-1	29	1,676	1,381	1,189	2,045	6,291
8-2	41	2,585	1,159	1,177	4,275	9,196
9-2	30	2,203	829	1,231	1,116	6,009
10-1	25	3,214	1,195	976	3,480	8,865
11-1	36	1,439	2,489	958	3,378	8,264
12-2	24.5	2,115	1,212	1,408	3,551	8,286
13-2	56	1,785	1,374	736	6,187	10,082
14-2	20	2,101	1,244	---	3,484	---
15-2	17	1,884	1,671	---	5,554	---
16-1	24	2,754	1,386	1,766	4,635	10,541
17-1	25	3,037	1,493	2,580	2,095	9,205
18-2	28	1,710	1,283	1,009	3,354	7,356
19-2	33	2,300	822	1,045	3,161	7,328
20-2	37	2,211	1,082	841	5,573	9,707

Table D-5

SCHOOL EQUIPMENT COSTS

School	Total Classes	Total School Equipment Cost			Equipment Cost Per Class
		AV	Office	Total	
1-1	34	$ 4,156	$ 1,717	$ 5,870	$ 173
2-1	25	6,999	2,013	9,012	360
3-1	20	2,919	---	---	---
4-1	45	22,272	---	---	---
5-1	29.5	3,798	3,731	7,529	255
6-1	49	3,284	---	---	---
7-1	29	3,090	1,626	4,716	163
8-2	41	4,314	2,274	6,588	160
9-2	30	2,533	1,073	3,606	120
10-1	25	3,940	1,862	5,802	232
11-1	36	8,172	2,814	10,986	305
12-2	24.5	5,832	1,862	7,694	314
13-2	56	4,816	118	4,933	88
14-2	20	2,333	2,887	5,220	261
15-2	17	3,239	3,000	6,240	367
16-1	24	3,648	2,066	5,714	238
17-1	25	3,332	3,178	6,510	260
18-2	28	4,925	3,265	8,190	293
19-2	33	---	---	---	---
20-2	37	4,311	707	5,018	134

Table D-6

RENP HEADQUARTERS OFFICE EQUIPMENT COSTS

	Price	Quantity	Amount	Life (years)	Annualized Investment at 7 percent	Maintenance Charge	Maintenance Cost	Annualized Cost
IBM Selectrics	$ 900	14	$ 12,600	10	$ 1,789.20	5%	$ 630.00	$ 2,419.20
Stencil Copiers	1,075	2	2,150	10	305.30	5%	107.50	412.80
Burners	500	2	1,000	5	244.00	5%	50.00	294.00
Collator (manual)	35	1	35	5	8.54	0	0	8.54
Folder	490	1	490	5	119.56	5%	24.50	144.06
Platemaker for Offset	500	1	500	5	122.00	5%	25.00	147.00
Offset	2,935	1	2,935	10	416.77	5%	146.80	563.57
Calculators (Monroe)	300	5	300	5	73.20	5%	15.00	88.20
Royal Typewriters	440	2	440	10	62.48	5%	22.00	84.48
Laminating Film Machine	800	1	800	10	113.60	5%	40.00	153.60
Viewlex	27	3	81	10	11.50	5%	4.05	15.55
Dolly	50	1	50	10	7.10	0	0	7.10
Papercutter	38	1	38	20	3.57	0	0	3.57
Movie Screen	100	1	100	10	14.20	0	0	14.20
Ditto (motorized)	615	1	815	10	87.33	5%	30.75	118.08
Professional Desks	230	27	6,210	20	583.74	0	0	583.74
Professional Chairs	55	27	1,485	20	139.59	0	0	139.59
File Cabinets	100	19	1,900	15	209.00	0	0	209.00
Bookcases	76	7	532	20	50.08	0	0	50.08
Storage Cabinets	110	2	220	20	20.68	0	0	20.68
Rental for Office Copier								3,240.00
Total Equipment Costs								$ 8,559.30

Table D-7

FORMULAS USED TO COMPUTE ANNUALIZED INVESTMENT COSTS AT 7 PERCENT FOR OFFICE EQUIPMENT

Equipment Life (years)	Formula
5	Price x .244
10	Price x .142
15	Price x .110
20	Price x .094

Table D-8

RENP HEADQUARTERS SALARIES ANALYSIS

FTE	Job	Grade	Salary(1) (Loaded)	Allocation			
				Reading	Math	Parent/ Community	Management
1	Director	TSA 5	$ 30,173				$ 30,173
1	Assistant Director--Reading	TSA 8	25,354	$ 25,354			
1	Assistant Director--Math	TSA 8	25,354		$ 25,354		
1	Assistant Director--PCI	GS-12	24,578			$ 24,578	
1	Resource Coordinator	GS-11	20,607				20,607
1	Public Information	GS-11	20,607				20,607
1	Research and Evaluation	TSA10	23,843				23,843
1	Assistant Director--Management	GS-12	24,578				24,578
1	Account Clerk	GS-7	14,437				14,437
1	Administrative Assistant--personnel	GS-7	14,437				14,437
1	Secretary to Director	GS-6	13,532				13,532
1	Office Services--Supervisor	GS-5	11,602				11,602
1	Receptionist	GS-3	8,950				8,950
1	Machine Operator	GS-3	8,950				8,950
2	Community Relations Specialists	GS-5	23,204			23,204	
1	Program Assistant--Reading	TSA10	23,843	23,843			
1	Program Assistant--Math	TSA10	23,843		23,843		
1	Secretary--Reading	GS-5	11,602	11,602			
1	Secretary--Math	GS-5	11,602		11,602		
1	Secretary--PCI	GS-5	11,602			11,602	
1	Administrative Assistant-PCI	GS-6	13,532			13,532	
1	Program Assistant--PCI	GS-7	14,437			14,437	
2	Senior Community Organizers	GS-6	27,064			27,064	
TOTALS			$ 427,731	$ 60,799	$ 60,799	$ 114,417	$ 191,716

1. FY1977 Salary Tables--Regular Budget Average Salaries for all regular budget, impact aid, and indirect cost positions based on 2-76 payroll data, Budget Division, April, 1976.

Table D-9

ALLOCATION OF RENP HEADQUARTERS SALARIES TO RENP COMPONENTS

Allocations of Management Cost Center

Component	Component Management	General Management	Totals
Reading	$ 60,799	$ 63,905	$ 124,704
Mathematics	60,799	63,905	124,704
Parent-Community	114,417	63,906	178,323
Totals			$ 427,731

APPENDIX E

COMPUTATION OF ADJUSTED COSTS FROM INSTRUCTIONAL DIMENSIONS STUDY DATA

TABLE E-1

PROGRAM COSTS PER STUDENT YEAR BY SAMPLE

THIRD GRADE READING

($ per Student Annually)

	Pullout Sample (n=86)		Regular Sample[1] (n=87)		Full Sample (n=173)	
Program Cost Subtotal	M	s.d.	M	s.d.	M	s.d.
Regular Instruction	110.79	50.46	160.88	68.67	135.98	65.30
Compensatory Education Instruction	263.51	133.69	-	-	130.93	162.00
Program Planning	133.88	53.97	67.34	35.46	100.42	56.45
Program Training	27.64	21.38	10.93	12.10	19.23	19.25
Program Decision-Making	32.17	31.10	13.20	12.84	22.63	25.56
Program Administration	14.07	11.25	8.13	3.83	8.57	10.01
Total Program Cost	582.06	185.36	255.48	74.85	417.83	215.78

[1] Compensatory Education Instruction cost is not presented for students in the Regular sample because the instruction time is included under the Regular Instruction cost and cannot be identified at this time as a separate cost item. (In third grade reading, the Regular sample consisted of 8.4 percent compensatory education participants.)

[2] This table is an exact reproduction of Table XI-3 in Final Report of the Instructional Dimensions Study.

TABLE E-2

PROGRAM COSTS PER STUDENT YEAR BY SAMPLE

THIRD GRADE MATH

($ per Student Annually)

	Pullout Sample (n=46)		Regular Sample[1] (n=107)		Full Sample (n=153)	
Program Cost Subtotal	M	s.d.	M	s.d.	M	s.d.
Regular Instruction	57.99	21.44	86.50	33.34	77.93	32.96
Compensatory Education Instruction	248.14	102.29	-	-	74.60	126.86
Program Planning	98.51	46.53	48.72	31.56	63.69	43.23
Program Training	20.75	12.29	6.04	7.83	10.28	11.41
Program Decision-Making	25.30	16.23	11.97	13.55	15.98	15.66
Program Administration	9.19	8.76	1.77	2.03	4.00	6.13
Total Program Cost	459.27	118.87	155.01	54.41	246.49	160.57

[1] Compensatory Education Instruction cost is not presented for students in the Regular sample because the instruction time is included under the Regular Instruction cost and cannot be identified at this time as a separate cost item. (In third grade math, the Regular sample consisted of 4.5 percent compensatory education participants.)

[2] This table is an exact reproduction of Table XI-4 in Final Report of the Instructional Dimensions Study.

TABLE E-3

COMPUTATION OF AVERAGE INCREMENTAL COST PER STUDENT

Program	Average Cost Per Student		
	Pullout	Regular	Incremental
MATHEMATICS	$ 459	$ 155	$ 304
READING	582	255	327
MATHEMATICS AND READING			631

TABLE E-4

ADJUSTED COST PER STUDENT

Program	Average Cost Per Student		
	Incremental	National Average	Adjusted
MATHEMATICS	$ 304	$ 1,284	$ 1,588
READING	327	1,284	1,611
MATHEMATICS AND READING	631	1,284	1,915

APPENDIX F

COMPUTATION OF ADJUSTED COSTS FROM MICHIGAN STUDY DATA

TABLE F-1

1974-75 SPECIFIC ACTIVITY COSTS (DOLLARS PER STUDENT ANNUALLY)

GROUPINGS OF SITES	CLASSROOM READING ACTIVITIES		PLANNING FOR COMP ED READING		TRAINING FOR COMP ED READING		DECISION MAKING FOR COMP ED READING		ADMINISTRATIVE ACTIVITIES FOR COMP ED READING		ALL COMP ED READING ACTIVITIES
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN
Title I Sites (n - 34)	295.6	156.5	145.0	112.2	28.5	30.2	83.7	93.1	39.3	44.9	592.1

[1] This table is a partial reproduction of Table 16 in Report of the 1975-75 Michigan Cost-Effectiveness Study.

TABLE F-2

COMPUTATION OF AVERAGE INCREMENTAL COST PER STUDENT

Program	Cost Per Student for Reading Activities		
	All COMP ED	Classroom	Incremental
MATHEMATICS[1]			$ 246
READING	$ 579	$ 296	296
MATHEMATICS AND READING			542

[1] Mathematic's costs were not reported. They were estimated as being 83 percent of reading costs. See text for a full discussion.

TABLE F-3

COMPUTATION OF ADJUSTED COST PER STUDENT

Program	Average Cost Per Student		
	Incremental	National Average	Adjusted
MATHEMATICS	$ 246	$ 1,284	$ 1,530
READING	296	1,284	1,580
MATHEMATICS AND READING	542	1,284	1,826

APPENDIX G

COMPARISON OF TRAINING COSTS

TABLE G-1

AVERAGE COST PER STUDENT FOR TRAINING

Program	Staff Training Cost[1]
RENP (Reading and Mathematics)	$ 644
Culturally Democratic Learning Environment Model	526
Role Trade Model	514
Learning Systems Corporation-Early Childhood Model	158
Bank Street Model	146
Michigan Study (Mathematics and Reading)[2]	52
Instructional Dimensions Study (Reading and Mathematics)	48

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[1] These are the reported costs for staff training. The trained staff consists almost entirely of classroom personnel. However, administrators are also included.

[2] Mathematics training costs were not reported but were estimated as being 83 percent of reading training costs.